from

CHURCH BELLS

to

ELECTRIC SIGNALS

A Story of The Chicago Fire Alarm System

Writers Program Illinois

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A story of the
Chicago Fire Alarm System
1940

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Sponsored by the
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William H. Johnson, Superintendent

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AUTHOR'S PREFACE

This pamphlet is one of the "Know Chicago" series of booklets, designed and especially written for 8A Social Studies in the Chicago Public Schools. The writer of each booklet in the series read at least one chapter of his manuscript to an 8A class in a social studies workshop school and made changes based on the reactions of the boys and girls in his audience.

The social studies workshops are schools where teachers and pupils are laboring to gain a deeper understanding of their country and its problems and of those of the rest of the world the while they live and work together according to the American Way of Life.

The booklet has been made possible in large part through the courtesy and co-operation of Michael J. Corrigan, fire commissioner, City of Chicago; John T. Gegan, chief fire alarm operator; Michael J. Hanley, chief of fire alarm wires; the National Board of Fire Underwriters, Chicago; and the Gamewell Company of Chicago.

For the history of the alarm system up to the opening of the present century, the author is indebted chiefly to A Synoptic History of the Chicago Fire Department, compiled and edited by James S. McQuade, and the Andreas' History of Chicago.

Herman A. Dick,
the author.

FROM CHURCH BELLS TO ELECTRIC SIGNALS

The Story of the Chicago Fire Alarm System

When Chicago firemen refer to their alarm system as the finest or the fastest in the world, they are thinking not so much of the alarm equipment itself, good as it is, but of the speed with which the system operates. In Chicago an alarm of fire is frequently transmitted from the central office to the company or companies which are to respond to it in a little less time than it takes in other large cities under similar conditions.

To us a few seconds may not seem important, but firemen know that seconds gained may mean the saving of lives and property which would otherwise be lost or destroyed. In the early stages of a fire, particularly are those seconds important, for the amount of destruction per second increases as long as the fuel upon which the fire feeds is present. A fire is small when it starts and adding too much fuel in its early stages may put it out. But, the bigger the fire gets, the more the fuel it will consume in each second. That is why even seconds are important in the time necessary for firemen to get to a fire and to begin the work of putting it out. In large fires, destruction of property at the rate of $1,000 a minute is not unusual. The value of the property destroyed in the South Chicago grain elevator blaze of May 11, 1939, has been estimated at $2,500,000. Most of the destruction occured within a period of about two hours.

The first alarm was sounded at 8:53 in the morning. More apparatus and men were summoned at short intervals until the last call at 10:43 a.m. Thus, within about two hours' time the fire was under control and from then on began to taper off in intensity, even though piles of grain continued to smolder for days and even weeks afterward. During the first two hours of that fire $1,500,000 worth of property was destroyed. That was at the rate of $12,500 per minute.

The money value of property destroyed may not mean much to some of us, but when we learn that 10,000 lives are lost

every year in the United States by fire, we can appreciate why Chicago's fire fighters are proud of their alarm system and the advantage a few extra seconds gives them.

This alarm system is the result of many experiments and improvements during the period of one hundred years or more in which Chicago has had a fire department.

Fire Alarms in Former Days

Before the telegraph alarm was introduced, alarms of fire were sounded by the simple methods still used in many small towns--ringing a bell or striking a metal wagon wheel tire. Today we find it hard to believe that Chicago was once a small town; yet in 1833, when the "town" of Chicago was incorporated, its population was less than 200 persons living and working in forty-three h o u s e s. A year before that Chicago had been a "frontier village of not more than half a dozen" wooden buildings. We do not know what m e a n s of sounding an alarm of fire was used during the first t e n years of Chicago's existence. The first recorded means was the ringing of a church bell.

That was in 1844 and the bell hung in the tower of the Unitarian Church, then located at the northeast corner of Washington and Dearborn Streets. Probably, before that time, an alarm was raised by shouting "Fire!" By this means, n o t only the members o f the volunteer fire department but the entire population of the town as well would be aroused. That would not have been a difficult matter, for in the early town and city of Chicago the houses were grouped together in a narrow strip along the Chicago River.

By 1844 Chicago had become a city of between 8,000 and 10,000 inhabitants and had an area of nine square miles; yet the only official fire alarm "system" of the time seems to have been that b e l l in the Unitarian Church. The person who first saw a fire ran to the church and pulled the bell rope; the volunteer firemen came running to the church, if they had not, in the meantime, been informed as to the location of the fire.

In the following ten years the city grew rapidly. By 1855 its area had increased to 17½ square miles, and its population to about 80,000 persons. The sound of the bell in the Unitarian Church could no longer reach all parts of the city. So the members of the First Baptist Church, then located at the southeast corner of La Salle and Washington Streets, offered the use of their bell for sounding alarms of fire in addition to calling the congregation to services. This was a larger bell than that of the Unitarian Church, and its ringing quality carried its tones much greater distances.

So effective was the Baptist Church bell that the city fathers undertook to secure its use exclusively for fire alarms purposes. When, in 1855, the second courthouse was built where the City Hall and County Building now stand, the First Baptist Church bell was transferred to the courthouse tower. Also at this time, a set of signals was introduced to indicate the general location of a fire.

The tower of the courthouse was made the city's official fire alarm station, and at all times, day and night, a watchman was on duty in the tower to look out for fires and to report their location by signals. The code adopted in 1855 was simple: first, eight strokes of the bell to attract attention, followed by a short pause; then, from one to six strokes to indicate in which of the city's six districts the fire had broken out.

A different code used before the Civil War was to hang out of the courthouse tower a certain number of flags or lanterns, to tell the place of a fire--flags during the day and lanterns at night. The ringing of bells seems, however, to have been more satisfactory, for a bell can be heard as well by night as by day and at greater distances than flags or lanterns can be seen.

In addition to the bell in the courthouse tower, smaller bells were, from time to time, placed in watch towers near fire stations in various parts of the city. When the man on duty in one of these towers saw a fire he sounded an alarm by means of his bell. Later, speaking tubes were installed

in the towers so that the man on watch could talk to the men in the firehouse below and describe the location of the fire. Still later, toward the close of the nineteenth century, the watchtowers were equipped with telegraph instruments for sending this information. Even after the telegraphic alarm equipment had been installed, however, some of the smaller alarm bells continued to serve, though they had to play second fiddle to the alarm telegraph. Several of the smaller bells remained in use until 1900.

Although in 1844 Samuel F. B. Morse demonstrated that the magnetic telegraph was practical, the principle was not applied immediately to the design and construction of telegraph fire alarm systems. It was not until 1856 that public demonstration of a successful telegraphic fire alarm system, developed from Morse's crude instruments and simple electric circuits, was held in the chamber of the Chicago city Council. But, the members of the council were not even then convinced of the need for the new system.

The Telegraphic Alarm

In May, 1863, a city council committee was authorized to make a study of the telegraphic fire alarm. As a result of this committee's recommendations, a contract for the installation of such a system was let the following spring. A little more than a year later, in June, 1865, Chicago's first fire alarm telegraph was turned over to the city authorities and placed in operation. More than a year was needed to install this first telegraphic alarm system and place it in operation. It cost $70,000.

The expenditure covered the cost of the central alarm office and equipment located in the dome of the courthouse; 106 alarm and call boxes; 125 miles of electric wire, much of it running along the roofs of houses; 14 electric gongs in engine houses; 6 bell-striking devices; and 6 dial instruments which enabled members of the police department to set up fire alarm code numbers to be automatically transmitted to the alarm office.

During the next few years the system was extended. But in the fire of October, 1871, it received a serious blow. The great Chicago fire destroyed not only the central alarm office but also forty-odd miles of wires, sixty fire alarm boxes, and other equipment.

The new system had become so important to the city that every effort was made to get it back into operation as soon as possible. In spite of confusion caused by the disaster, half the equipment - that on the near west side - was ready to use within two days. A week later, the south side was back to normal. Equipment and wire were purchased or borrowed from other cities and, in some cases, make-shift electrical devices and apparatus were used, particularly on the near north side, where total destruction of the system occurred.

One of the most difficult reconstruction problems was the placing of electric wire lines. The first telegraph alarm system, consisted of 125 miles of wires, and of these, 40 miles were destroyed. One reason for so much destruction was that wires were usually strung over roofs, from building to building; hence, both wires and houses were burned, or the wires broke when their supports toppled.

To get the alarm system back in operation, the city authorities had to replace those forty miles of wires. They could not, of course, be put back on houses which had been burned, and in addition so much building was going on in the downtown district that, if wires had been strung along roofs, they would have been broken. In fact, lines which had not been destroyed in the fire, frequently met with such accidents.

So the city began erecting its own poles for fire alarm lines and, in many cases, received permission to use the privately-owned poles of two telegraph companies--the Western Union Telegraph Company. In succeeding years, more and more poles were added until, in 1876, the last of the house-top wires had been removed from roofs. A l s o, about this time the alarm system's first submarine or "under-water" cable was laid. That was across the north branch of the Chicago River at Chicago Avenue.

First Building Erected
(after the Fire 1871)

A few years after the Great Fire, John P. Barrett, who was then superintendent of the fire alarm system, urged that as many land wires as possible be placed in conduits under the ground, for protection against minor accidents and breakage. Expert electricians in other cities are said to have scoffed at the plan. Perhaps for this reason Barrett's suggestion was not carried out at the time, and for many years all alarm wires--except those which ran under the Chicago River--were placed on poles, a cheaper method than running wires in conduits underground, though not as safe.

Still the men in charge of the alarm system continued to urge the placing of underground wires, and by the time of the first World's Fair in Chicago, 1893, none of the alarm lines in what is now the Loop district remained above ground. More and more miles of wire were placed underground every succeeding year until today, of Chicago's 2,500 miles of alarm wires, about three-fourths are under-ground and only one-fourth on poles.

The Joker and "Talking" Lines

Four or five years after the fire of 1871 came the installation of the joker--an event which was to have a very great effect, not only on our own alarm system but on those of other cities. The "joker" is simply a telegraphic receiving set. It is a type of circuit which makes possible the sending of all alarms to all fire stations at once without adding any lines. We shall learn more about the joker later on.

During 1878 fourteen engine houses were connected with the central alarm office through what were named "talking" lines --to distinguish them from the telegraph lines. The name, "talking line" has survived to this day to designate what are generally known simply as telephones.

In the following years the installation of both "talking" and "joker" lines continued rapidly. In 1879, the practice of connecting the alarm office by telephone with police stations, pumping stations, and other city administration

buildings was started. City employees, other than firemen, were thus enabled to send direct alarms to the fire department. By 1882, "joker" lines also were being installed in police stations.

Toward the end of 1883, every fire station had been connected with the central alarm office by both telephone and telegraph, and all police stations by telegraphic alarm lines. Today, however, only division headquarters of police are connected with the fire alarm office by telegraphic alarm lines. When fires require the services of policemen to handle traffic and keep over-curious citizens "out from under the feet" of firemen, divisional police headquarters now notify local district officers by telephone or radio.

During the thirteen years between 1871 and 1884, not only the central alarm office but all city departments had been housed in the "old" Rookery, a two-story structure at the southeast corner of Adams and La Salle Streets, where now stands another building also called "The Rookery." Chicago then boasted that it had the best-equipped fire alarm office in the world. That claim may have been the result of over-enthusiasm or it may have been a fact; which ever it was, it showed the spirit of a reborn Chicago.

The city hall to which the fire alarm office was removed in 1884 was the same structure in which the office is now housed, although the building stood on another site. The present city hall and fire alarm office were first occupied in 1911.

Recent Progress

The past fifty years have seen many changes and improvements in the alarm system. Most of these changes, however, have been of a highly-technical nature.

In 1901 a "double joker" system replaced the "joker and transmitter" lines, which had been used previously.

In 1911 a wall map was installed in the central alarm office

which showed by means of lights, all the fire stations in the city. This was of great value in relocating and dispatching fire companies on second and other "extra" alarms. In 1940 a greatly superior wall map replaced the 1911 model.

In 1927, after the fire department had been completely motorized and new companies and equipment had been added, the present "running card" schedule was first used. This tells which companies are to go out on each box alarm, and also provides for fourth and fifth alarms and for "automatic relocations" - that is, moving companies to take care of districts of the city from which other companies have gone to fight a bad fire.

In 1928 direct alarm lines were installed from a switchboard in the central alarm office to public utility companies whose services might be affected or interrupted by fires--utilities such as gas, electric, telephone, and transportation lines. Such companies now receive directly, by means of telegraphic alarm lines, all fire calls, both box and still. In the same year all fire stations were equipped with a second telephone line, known as the marshal's line, which enabled fire marshals to hold direct conversations with company officers and firemen.

"Amplifiers" or loud speakers, which are now used in all fire stations north of Pershing Road to report locations of still alarms, were first installed in 1938. In the district south of Pershing Road "still alarm" loud speakers are now being installed.

Still and Box Alarms

Just when and how the expression "still alarm" originated we do not know. However, the term goes back to the days before telegraphic alarm systems and telephones had been invented, to the time when the ringing of a bell or some similar means of sounding an alarm was used to call out volunteer firemen and other members of the community. If a blaze were not large or did not seem very dangerous, someone might summon a few firemen or neighbors without ringing the alarm bell and rousing the whole community.

In grandfather's day a still alarm was one given at a fire-house by word of mouth, and the same term is used today. However, its meaning has enlarged to include telegraphic and telephoned alarms, which compose 98 per cent of the total, less than 2 per cent being reported directly at fire houses. Today almost 90 per cent of all fire alarms come in over telephones.

Thus, the term "still alarm" means any alarm which does not come into the central office from a box.

While only about 8 per cent of all fire alarms come from boxes, they play an important part in the work of the fire department. Still and box alarms are not only received differently at the alarm office but are transmitted by somewhat different methods. Also fewer men and pieces of apparatus are sent out in response to a still alarm--unless the person reporting by telephone or in person indicates that the fire is serious or threatens to become serious. In that case, as many men and as much apparatus are sent as if the alarm had come from a box, but this averages only four out of every thousand fires reported by phone.

Suppose a telephone message indicates that an automobile is on fire in the street-not in a garage. Probably only one engine will be sent to the scene. A small prairie blaze reported by telephone would be handled in the same way.

If these same fires were reported by sending in an alarm from a nearby box, the fire department would send out all the equipment scheduled to answer an alarm from that particular box. Perhaps two or three engines, one or two hook and ladder trucks, and possibly four or five other pieces of apparatus. Imagine, if you can, what would happen to Chicago traffic if all that apparatus were sent out in answer to each of the twenty-odd thousand still alarms which come into the central office each year.

Sending Still Alarms

A telephoned alarm of fire is so easy to send in Chicago that even a small child can do it. All one needs to know is

his address and this number: Fire 1313. That is the telephone number of the central fire alarm office.

When a voice responds, "Fire Department," give the street location of the fire. Speak distinctly; slowly, if necessary, but, in any event, distinctly.

Then, give the alarm office one more piece of information; that is, what is burning. That will help in determining the apparatus and equipment to send to the fire.

Shortly after you have hung up the receiver, you will be able to hear the sound of a siren heralding the approach of an engine on its way to put out the fire you have reported.

Should you make your call for the fire department over a dial telephone, you will dial F-I-R 1313 and, when the department responds, give the necessary information. If you have any doubt of your ability to dial F-I-R 1313 correctly, you had best simply dial "Operator," and, when the telephone girl answers, tell her you want Fire 1313. Then proceed just as previously outlined.

For several reasons we have discussed telephoned alarms before box alarms, for at least ten alarms are telephoned for every one sent through boxes. Also, there are about a million telephones, and only about 2,500 alarm boxes, in Chicago. Also a telephone is usually closer to the scene of a fire than the nearest alarm box. Often one can send an alarm by telephone without having to go outdoors or to dress fully. Finally, telephoned information about a fire makes it possible for apparatus to proceed directly to the scene, instead of having first to go to the box from which an alarm has been sent and there learn the location of the fire.

Sending Box Alarms

Nevertheless, the box alarm, too, has advantages. Fires in schools, theaters, and other places where numbers of people gather should preferably be reported by the box alarm. Boxes are located at most mile and half-mile intersections and at some quarter-mile intersections, as well as in front of schools,

theaters, hospitals and other institutions and some large commercial and industrial plants. In the downtown district often several boxes have been placed on the same block.

The mechanisms inside these boxes are all similar, though there are two distinct types of doors, called respectively, key and keyless doors. One should remember that with either type the alarm is sent only when the hook has been pulled down. One should also remember that after an alarm has been sent some one must remain at the box until the firemen come, in order to direct them to the exact location of the fire.

The key-type door is opened by means of a key which may be obtained from a storekeeper nearby or,if there are no stores in the vicinity, from a householder. Twenty or more keys are generally available in the neighborhood of each box. A n alarm is sent from this type of box by opening the outer door with a key,and then pulling down a hook inside the box.

The second type, called the "turn-handle" or keyless door, may be distinguished not only by the T-shaped handle on the outside but also by the fact that the front-door casing extends several inches from the box proper. The key door, on the other hand, is flat and flush with the front edge of the box.

The keyless-door is opened by turning the T-shaped handle to the right. Turning this handle rings a bell in the cover casing but does not send an alarm. The alarm is sent--as in the case of the key-door type of box--by pulling down a hook inside the box and then letting go. The purpose of the bell-ringing door handle is to give notice of the fact that someone is sending an alarm, thus discouraging the sending of false alarms. Severe penalties are provided by law for maliciously or mischievously sending false alarms.

In front of many schools there are alarm boxes with bell-ringing keyless doors.If a key-door box is used at a school, the office and the janitor or engineer keep the keys.

The officer on the first piece of apparatus which arrives at the scene will, at a glance be able to tell whether a fire

is going to prove stubborn and will immediately summon more equipment if that seems necessary.

Additional calls for apparatus and equipment are known in the department as "extra alarms" and are designated by those somewhat mysterious symbols 2-11, 3-11, 4-11, and 5-11. They mean simply: second, third, fourth and fifth alarm, respectively.

Previous to 1878 there was in the code a 6-11 or "general" signal. From 1878 to 1927 department practice provided for first, second, and third box alarms, followed by special calls for any additional apparatus needed. Under the present system, inaugurated in 1927, there are five regular box alarms which are followed by or include special calls.

What apparatus moves in response to each box alarm is determined by a schedule kept on "running cards," of which each station has a complete file. At an extra-alarm fire, the alarm box serves both as a means of communication with the fire department as a whole and as a center of operations. The officer in command uses it not only for sending regular extra alarms but also as a means of calling apparatus and equipment which is especially needed. In the back of each box is a telegraph key which is used for communication with the central alarm office. There is a telegraphic code signal for every requirement which might arise at a fire. More engines than usual might be needed, or an ambulance, high-pressure apparatus, a gasoline supply truck; in fact, any apparatus not on the regular running schedule. If so, the officer need only send the appropriate signal.

Suppose it is ambulances which are needed. The officer telegraphs the signals 3-5, gives the number of ambulances desired, and finally the code number which is his own signature. In similar manner, special calls may be sent for a physician, a superior officer, or for additional apparatus.

How the Alarm System Works

Let us at the outset fix in our minds two facts; first, that all Chicago fire alarms pass through the central alarm of-

fice and, second, that all alarms, sooner or later, go to every fire house in the city.

About 98 per cent of all alarms originate at places other than fire department buildings,go into the central alarm office, and are relayed by that office not only to the company or companies which are to respond but also to all the other fire companies in the city.

There is one exception to this general procedure. Some 500 alarms a year are reported directly to fire houses. The company receiving such a verbal alarm responds immediately, but not until the officer in charge has telegraphed the central office in code that his company is going out in response to a still alarm and has telephoned the fire's location. The central office relays the information to all the other stations in the city.

An alarm of this type is called by the fire department a "company still" and, with the exceptions noted, is handled like other still alarms.

We are standing, let us say, before box No.427. The number, however, does not appear on the outside of the box, nor even on the inside after we have opened the outer door. Having opened the outer door of the box,we see a flat metal surface which has a slot in it. At the top of the slot a short brass handle sticks out and points toward us. The instructions on the flat surface tell us to "pull the handle down once and let go." We follow instructions, and immediately a whirring sound comes from the inside of the box.

A clock mechanism, driven by a spring, was wound by pulling down the little handle, and set a chain of gears in motion. The last gear wheel in the chain, instead of being of brass or steel like the other gears, is made of hard rubber--and some of its teeth are missing. In this particular box, No. 427, on the circumference of the little wheel there are four teeth, and then one missing; two teeth, and another tooth missing; and finally, seven teeth, with more teeth missing between the last of the seven and the first four we counted.

That wheel, driven by the clockwork, revolves and its teeth operate a small telegraph key, sending to the central alarm office signals corresponding to the spacings of its teeth--that is, four dots and a pause, two dots and a pause, and seven dots and a longer pause before beginning all over again. A box may send such a signal as many as sixteen times with one pull of the signal handle or hook.

No sooner had we pulled that hook than in the central alarm office an operator is standing at attention before telegraph sending keys. As the signal is received from our box, its number is transmitted throughout the city. No mistake about the number of the box which has been "pulled" is possible, for our signal has been received in the alarm office not only on a telegraphic sounder by also on a bell and on a device which has printed marks corresponding to the sound signals on a strip of paper tape. The alarm office operator sends the box signal twice on one transmitting key and then twice more on another similar key next to the first.

On a broad shelf in the fire houses are two glass cases each containing several instruments. There are also push buttons and a telegraph sending key. This shelf with the instruments and buttons is known as the watch desk. One of these instruments is the "register." It looks and sounds something like a stock ticker. It stands off by itself on one side of the watch desk. As the box signals come in, a strip of tape on which are ink marks, indicating the number of the box, is fed from the register. This tape record is similar to that in the alarm office except that the tape in the alarm office was operated through the signal which came from the box, while the register tape in the fire station is marked through signals which have been retransmitted by the alarm office operator.

The tape which is coming from the register and feeding over the edge of the desk into a waste basket, is marked by four dots, a space; two dots, a space; seven dots, a longer space. The register prints that set of markings four times, twice from the signals sent over the first alarm office key and twice from the second. The sets of signals have been sent over two different lines. As long as both lines are in work-

ing order--and they usually are-- each set of box signals will come in four times. If, however, as happens in rare cases, one of the lines is out of order at some particular fire house, the box signal will still come in twice on the line which is working and will be printed on the register tape.

The devices which feed the register tape and make the ink marks on it are operated by a clockwork mechanism which is wound every day. But it is the electric current of the signal which trips the device,meanwhile tapping a bell in unison with the ink markings.

The first two rounds of the box signal came in not only on the register but also on the telegraphic sounder in the other of the two glass cases on the watch desk. This second instrument is called the "joker," a term which has been the subject of much speculation on the part of persons in the fire department as well as of outsiders.

Theories as to the origin of the name are numerous. Two of the more acceptable explanations of why the "joker" was so named are: first, that several different sorts of signals are sent over the line, instead of only one, as is the case of the ordinary telegraphic sounder; second, that in the early days of the telegraphic fire alarm department messages were sent in a code which differed from ordinary Morse.

Technical men may call the two lines over which box signals are sent the primary and secondary alarm lines. To Chicago firemen these two circuits have long been known as the "joker" line and the "alarm" line. The reason for these commonly-used names is evident--the first two rounds of signals operate the "joker" as well as the register, while the last two rounds come in on the alarm register only.

The last two rounds of box signals, that is, those sent over the alarm line, will also ring a big firehouse gong, unless someone holds down the appropriate push button on the watch desk. For most of the box alarms received at any one station, the man on watch does press the "hold down" button while the last two rounds of an alarm are coming in. Since

all box alarms go to all fire stations in the city, each company responds to only a small proportion of the alarms received.

When the alarm gong rings, the firemen take it for granted that the signal is for a fire in their district and rush to their places on the apparatus. To allow the alarm gong to ring for fires other than those requiring the services of the company or companies at a house would be confusing.

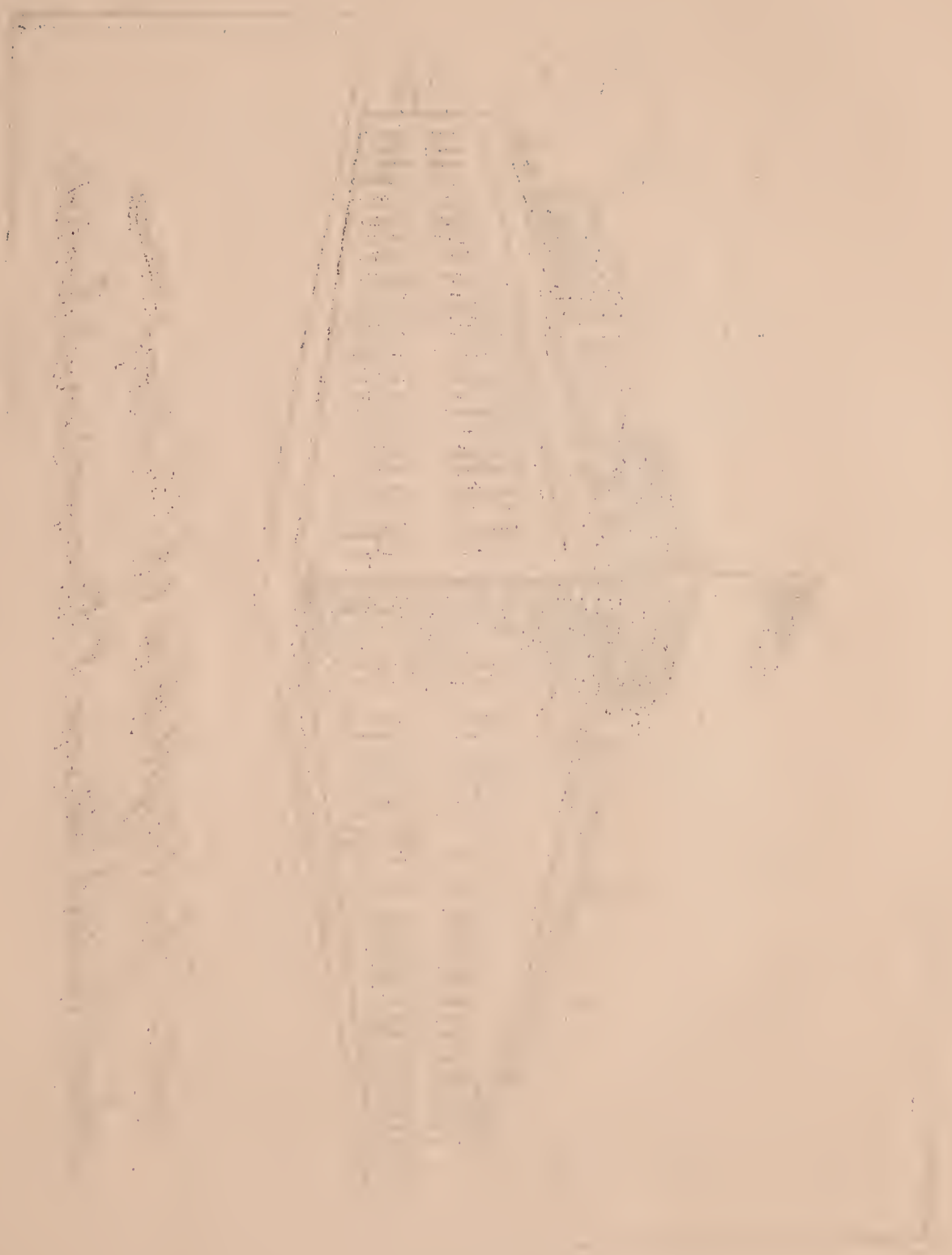
Whether a company should respond to any particular box alarm is never a matter of doubt. At the watch desk of each company is a wall chart which shows the numbers and locations of all boxes in the district covered by apparatus from that house on first box alarms. At the desk also is a map showing the territory in which the company responds to still alarms.

When a box alarm comes in for a company, the man on watch lets the gong ring on the last two rounds, the men rush to their places, and are on their way with a speed that only a person who has seen the performance can appreciate. The same thing is happening in the quarters of each of the half dozen or more companies which are scheduled to answer alarms from that particular box.

Meanwhile,men on watch in many other fire houses in the city have been looking up that same box number in their "running card" files. The "running files" are file cards on which the various companies are listed, along with their assigned area of operations. By referring to them man on watch can determine whether, in the event of a second alarm from that same box, their companies would move either to the fire or to another station vacated on the first alarm.

After a second alarm every company in the city knows from its running-card file just where the box is located and is prepared to move if a succeeding alarm should make it necessary. With each additional alarm more companies move from their houses and the interest of the firemen who have not yet been called becomes more intense.

The City Hall or Old Rookery
where Central Alarm Office was once located



At the Central Alarm Office

In the city hall alarm office, a second alarm starts activities resembling those of a busy train dispatcher's quarters.

An operator throws a switch and an enormous wall map of the city gleams with several hundred lights. Each light represents a fire station. The lights shine through frosted glass discs. A white disc with red numbers indicates an engine house. A red disc with white numbers marks the location of a hook and ladder company. If two companies have quarters in the same house, the lighted disc on the wall map shows the number of the engine company on the upper half and of the truck company on the lower half.

Each light has its own button on a switchboard near the map. When a company leaves its quarters, an operator turns off the corresponding light, whether the company is answering an alarm or is on its way to take the place of a company which has gone to the fire. The absence of lights at the map locations of companies which are at a fire or are moving shows clearly that the territories usually served by these companies are temporarily without maximum fire protection. Should a fire break out in a district from which the regular company has gone, the alarm office operator would summon the nearest available company.

During the course of an extra-alarm fire, a wall-map light goes on occasionally in a part of the map which had a moment before been dark, showing that a company's quarters have again been occupied, whether by the regular company or by a substitute. Even during a large fire certain pieces of apparatus are not needed. In such cases the officer in command sends the unneeded companies home and they inform the alarm office of their return by signalling 5-3-5 with the company's code signature. Likewise, when a company reaches a station to which it has been assigned temporarily, it gives the "return to quarters" signal, 3-3-5, with the signature of the company whose place is being taken and then the signature of the occupying company.

The alarm office operator in charge during a large fire is a busy man. He must know what houses are temporarily vacant and what companies are available for service. He must see that officers at the fire are furnished with all the apparatus and men that may be needed. In addition to all this, he must see that companies which are not on duty at a fire are relocated so as to furnish the greatest possible protection against fires in other parts of the city.

We have, thus, followed the course of a box alarm from the time the signal hook was pulled to the time the apparatus started for the fire. Let us now see how a still alarm is handled. The procedures differ greatly.

The still alarm, in practically all cases, comes into the central office by telephone. If the fire does not appear to be serious, the operator will send a direct call to the engine company nearest the fire. The engine is usually the only piece of apparatus sent to extinguish a small prairie fire or an automobile burning in the street. But, whenever the still alarm involves a fire in a building, a hook and ladder company also responds.

The manner in which still alarms are sent to companies differs slightly according to whether a company is located south or north of Pershing Road.

South of Pershing Road, the operator signals a company on its particular "joker" line. The other four or five houses on the line also receive the telegraphic signal at the same time. Then over a telephone line--called today, as when telephones were a novelty, the "talking" line--the alarm office tells the location and nature of the fire. At each of the other houses on that line the man on watch listened in on the directions and records on the company's slate or "board" the time of the alarm, the location of the fire, and the number of the company to which the alarm was sent.

The officer of the company called out has sent, by means of the telegraph key on the watch desk, the signal 5-5-5 followed by the company's number, thus telling the alarm office and the other stations on the line that his company was just

leaving for the fire. The alarm office, in turn, sends the same message out over the "joker" lines of all the other companies in the city.

The still alarm procedure we have described was used throughout Chicago up to a few years ago. However, in the district north of Pershing Road companies are now called out on still alarms by a somewhat different method.

Each fire house in the north and central district is equipped with a loud speaker or amplifier, connected by direct telephone line with the central alarm office. Still alarms for a company come to it individually over the amplifier.The voice of the alarm office operator first calls the company by number,then gives the location of the fire and its nature. The announcement can be heard all over the main floor of the fire station.

As the company is leaving the house,the officer in command strikes on his sending key the still alarm signal, 5-5-5 and his company signature. Then, over the "talking" line he repeats the location of the fire for the information of the other companies on that same line. From this point on, the procedure is the same as that described for the south district.

The work of the central alarm office,however, is not finished when it has sent to all the fire stations in the city notification that a particular company has left quarters in response to a still alarm. The danger may possibly prove to be greater than at first appeared. Accordingly, an alarm office operator has been looking up the number of the box nearest the fire. If another telephone call should come in, announcing that the flames were gaining headway, or if the officer of the comapny which responded to the alarm should call for additional apparatus, the office would send out a box alarm, whether or not the box had been "pulled."

The companies scheduled to respond to an alarm from that particular box would then go directly to the fire, the exact location of which had been noted on the company "boards"when the first still alarm was sounded. Additional alarms from

that same fire would be handled by regular box-alarm procedure.

We have described two different methods of relaying still alarms to fire stations in two sections of the city, and have thus far referred almost entirely to central alarm office operations as taking place in the City Hall. There are actually two alarm office districts. The purpose of the division is principally to avoid the running of lines too long to be operated economically. One district lies south of Pershing Road, the other takes in all of the city north of Pershing Road.

The Englewood branch alarm office, at 6361 Wentworth Avenue, renders for the south territory the services which the central alarm office performs for the rest of the city. All operations, however, are directed from the central office and there run from this office about twice as many circuits as from the Englewood branch. The two offices are connected by direct lines, and all alarms and other signals sent to all the stations in either district are automatically repeated to all the other stations in the city. The two offices, for all practical purposes, operate as one.

Some Technical Tidbits

All the boxes in the city are not on one line. There are approximately ninety separate lines, on each of which there are, on the average, thirty boxes connected in series. A series connection, in electrical terms, may be compared to a chain--if one link breaks the chain is broken.

Through all of the boxes on a line a current flows constantly as long as the line is in order and no box is sending a signal. When an alarm is being sent the current is interrupted at regular intervals and the corresponding signals are received at the central office.

To the uninformed person it might seem wasteful to keep the box current flowing all the time, but there is a good reason for the practice. When a box is damaged or the circuit is broken, the interruption becomes evident immediately at the

central alarm office and men are sent out to make the necessary repairs or adjustments.

The amount of current required to give such protection is astonishingly small. Less current runs through each box line than is needed for one seven-watt night light. The box current uses only six watts. A watt is the product of the number of volts times the number of amperes of an electrical current. Here are the figures. The box current has a strength of sixty milliamperes, that is, sixty one-thousandths of an ampere, and the line carries one-hundred volts. This small current is used, also, to send alarms from the central office to fire stations and to operate sounders, tape-marking devices, and big gongs.

The small current causes these devices to operate--it does not work them directly. To accomplish this purpose there is used what is called an electrical relay.

Relays are used extensively in telegraphic circuits of various kinds, such as, fire alarms, burglar alarms, and ordinary telegraphing. The relay is a means of using a comperatively weak current to operate at a distance an electro-magnet which opens or closes another circuit through which flows a current strong enough to do the necessary work.

In the case of alarm circuits, for instance, the six-watt current from the alarm office closes the gong circuit at a fire house, just as if a switch were closed, and the bell is rung by a house current like that in your home--strong enough to operate even a washing machine motor. In like manner, registers and sounders are operated at fire stations by weak signals sent from the alarm office.

The electro-magnet, through which the relay current does its work, differs greatly from the horse-shoe and bar magnets with which we have all played. Those are permanent magnets--the magnetism will last for years and years. An electro-magnet, on the other hand, is a temporary magnet. It works only when a current is flowing through the coil of the magnet.

An electro-magnet consists, simply, of a piece of soft iron-around which copper wire is wound like thread on a spool.The strength of the electro-magnet depends on how many turns of wire there are around the iron core and how many amperes of current are made to flow through the wire. A comparatively weak electro-magnet may be used in a relay circuit to close the circuit through which a much stronger current flows. Other, more powerful electro-magnets operate the clapper of a bell, move the heavy bar of a telegraph receiver, actuate tape-marking devices, and perform the other duties necessary to the efficient operation of so extensive an alarm system as that which we have in Chicago.